Trigonometry Workbook

The law of sines and law of cosines

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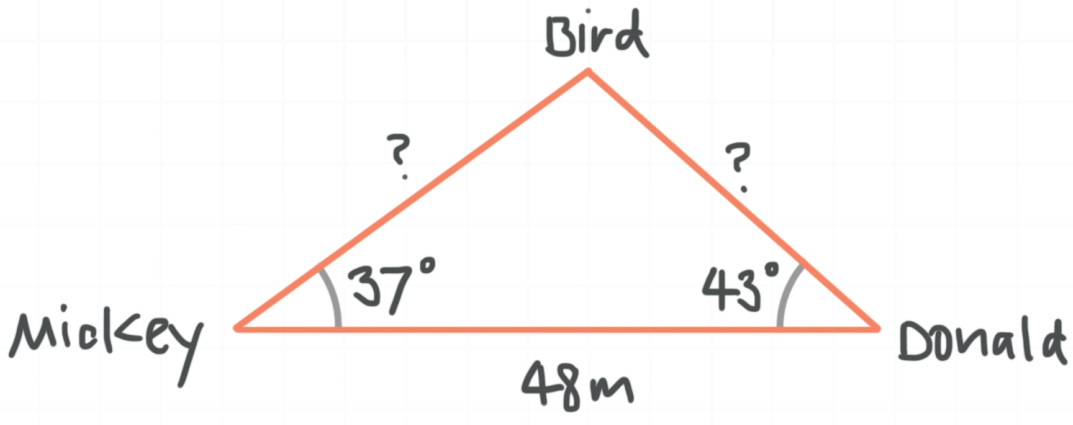
MATH

LAW OF SINES

■ 1. Mickey and Donald stand on different sides of a tree. Each of them sees the same bird in the tree. They measure the angles of elevation from themselves to the bird, and get $37°$ and $43°$ respectively. If Mickey and Donald are 48 m apart, find the distances from Mickey and Donald to the bird, rounded to the nearest meter.



■ 2. In triangle ABC, find the ratio of AC to AB, given that $m\angle A = \pi/6$ and $m\angle B = 2\pi/3$.

■ 3. The base of an isosceles triangle is 6 units long, and its opposite angle is $104°$. Find the triangle's perimeter.

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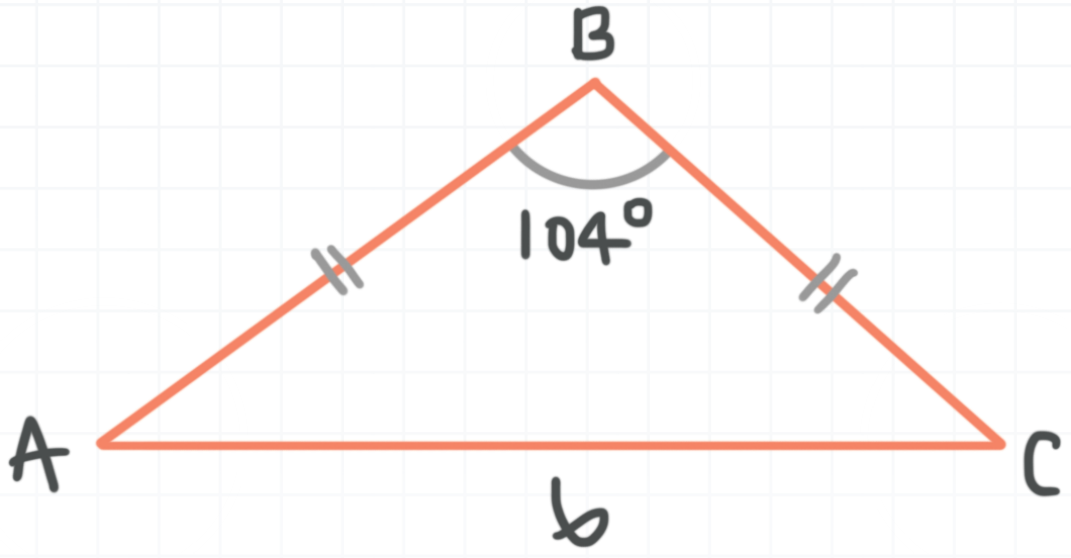

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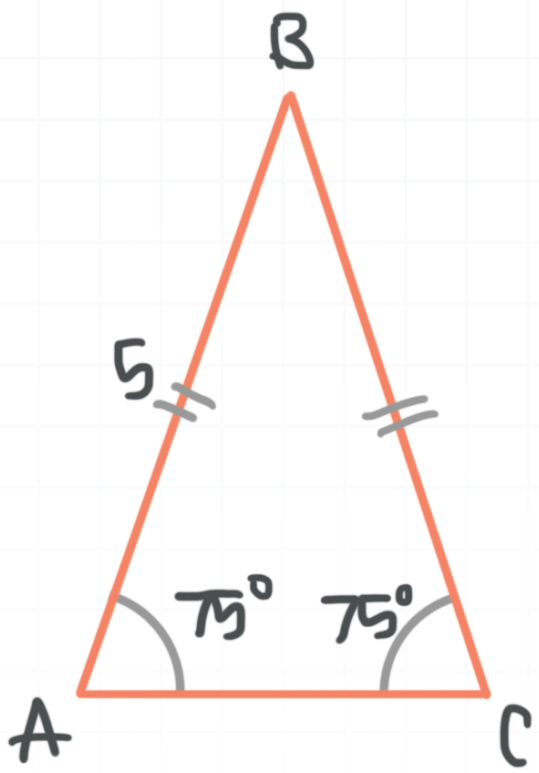
LAW OF COSINES

1. Find the perimeter of the isosceles.



2. Bob rides a Ferris wheel at a carnival. Find the distance from Bob to the lowest point of the wheel, given that the diameter of the wheel is 24 m, and that the angle of elevation of Bob with respect to the center of the wheel is $50°$.

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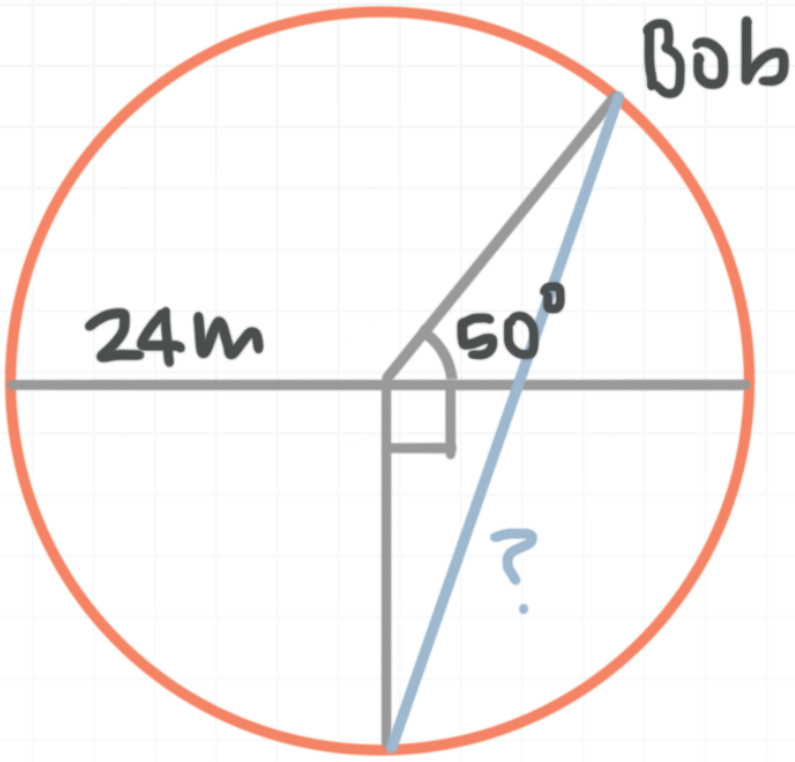
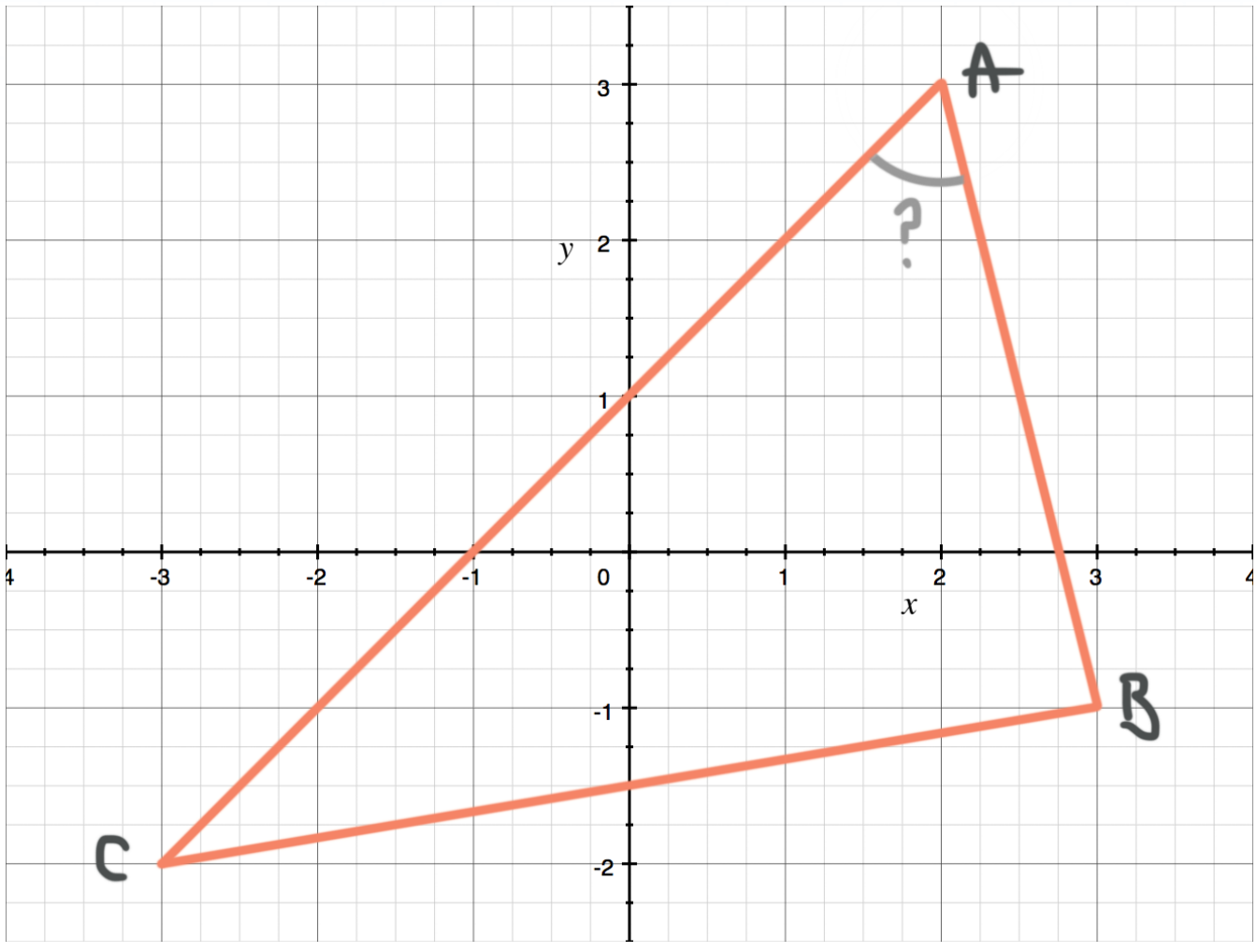


■ 3. In triangle ABC where $A(2,3)$, $B(3,-1)$, and $C(-3,-2)$, find the cosine of angle A.



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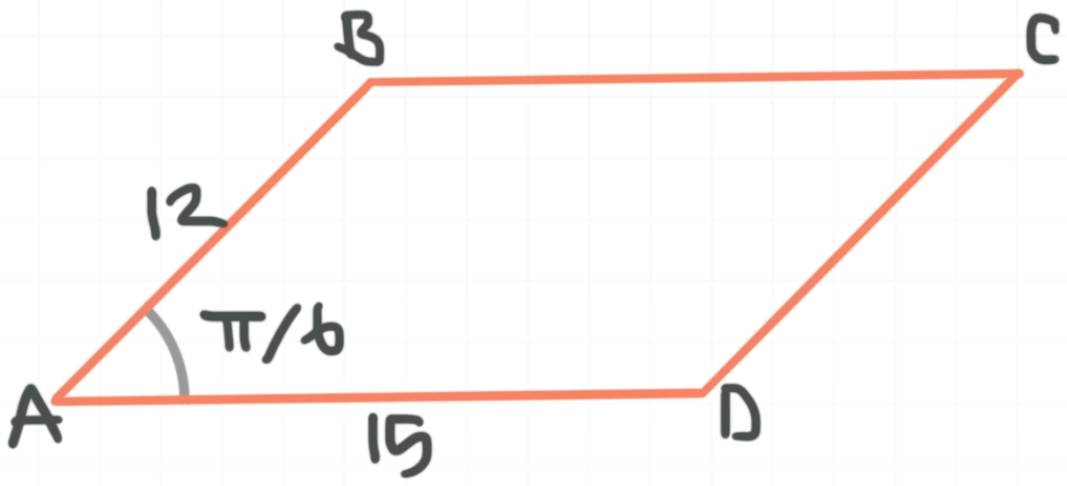
LAW OF SINES FOR AREA OF A TRIANGLE

1. Find the area of parallelogram $ABCD$ given that $AB = 12$, $AD = 15$, and $m\angle A = \pi/6$.



2. Maggie rides a Ferris wheel at a carnival. There are 12 cabins in the wheel, each positioned at a distance of 8 m from the center of the wheel. So the 12 cabins form a dodecagon (twelve-sided polygon). Find the area of the Ferris wheel.

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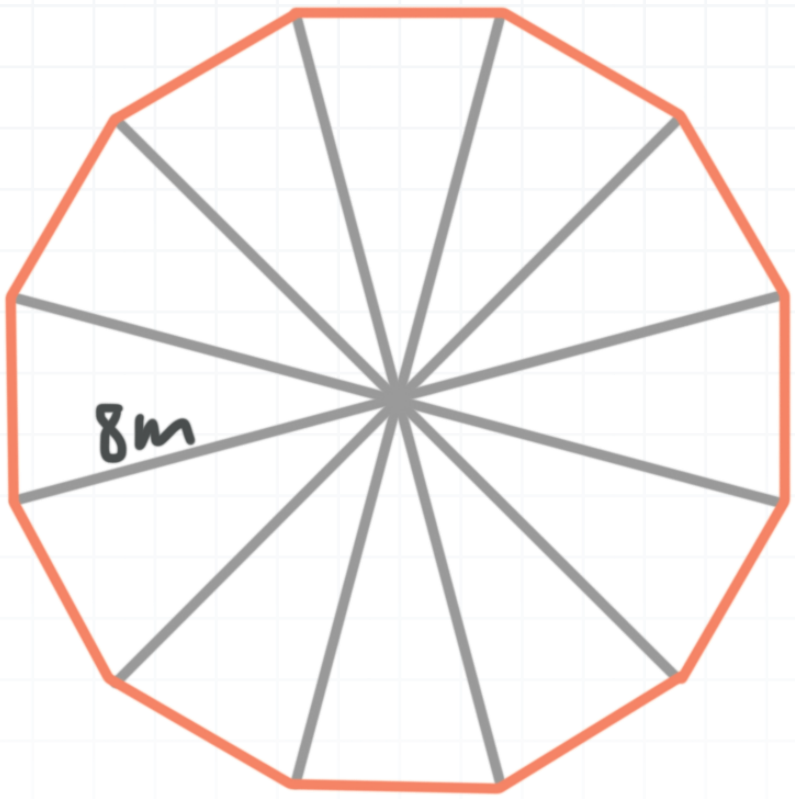

■ 3. A triangular-shaped plot of land has a base length 480 m that sits along a river. The land owner decides to split the plot into two equal parts (in terms of area), using a straight fence parallel to the river. Find the length of the fence.

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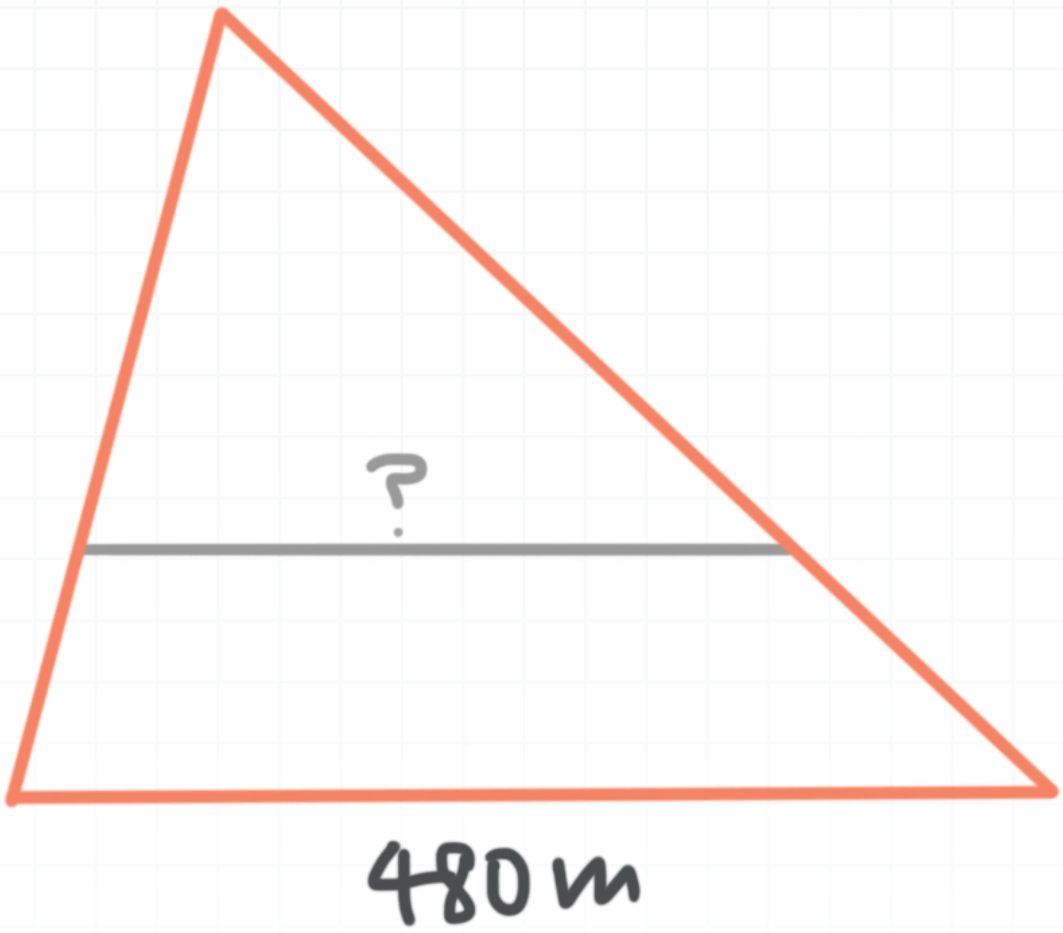

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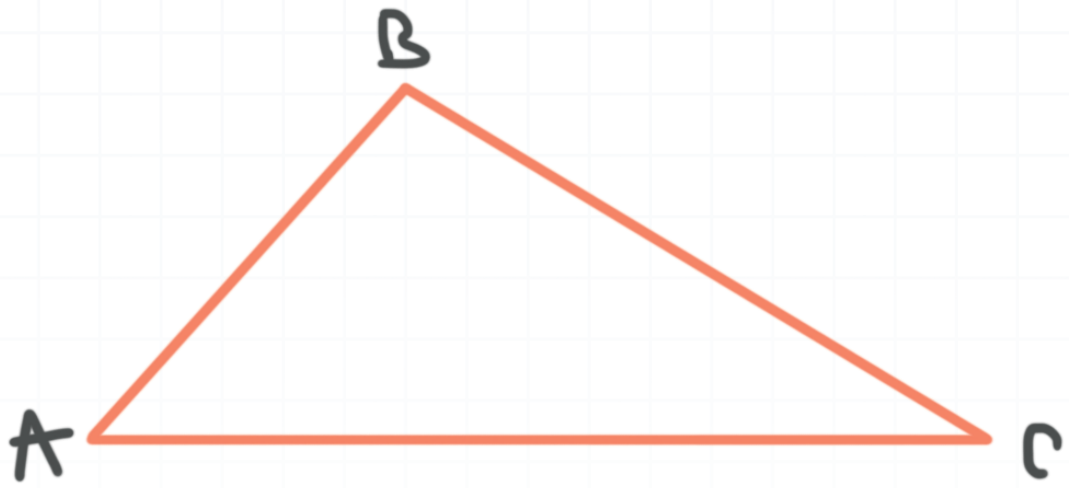
HERON'S FORMULA FOR AREA OF A TRIANGLE

1. In triangle ABC, the length of three sides AB, BC, and AC are in a ratio of $2:3:4$. Find the area of ABC if its perimeter is 18.



2. Use Heron's formula to find the area of triangle ABC, where $A(-1,4)$, $B(3,2)$, and $C(1,-1)$.

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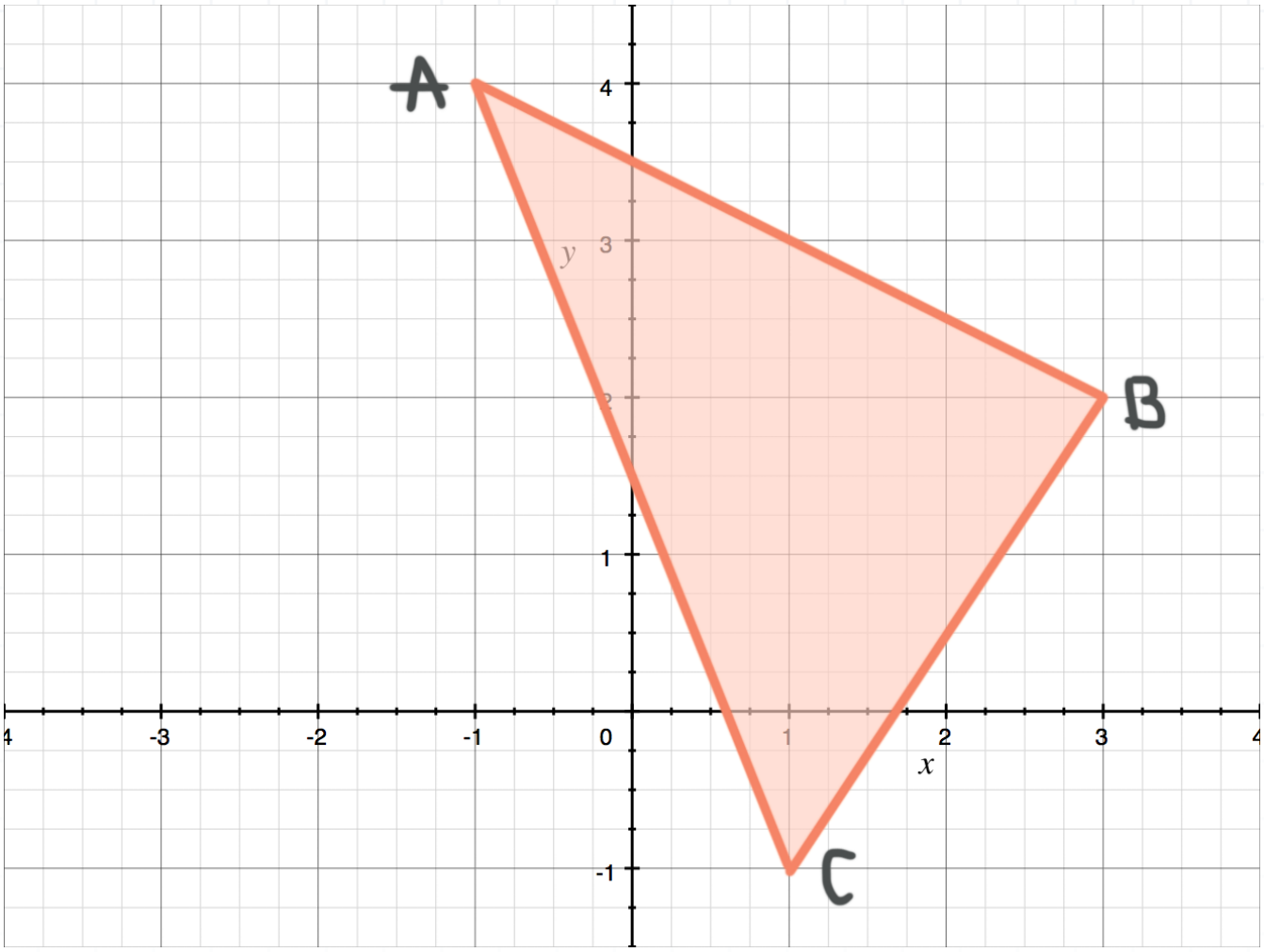

3. A plot of land is in the shape of an irregular quadrilateral. A barn is built on its westernmost vertex. The two sides of the plot adjacent to the barn have lengths 450 m and 320 m, with an included angle of $28°$. The other two sides are 280 m and 190 m.

A land owner decided to sell a triangular part of the land, formed by the two sides distant from the barn (shaded in the figure below). Help the land owner find the area of the plot he's going to sell.

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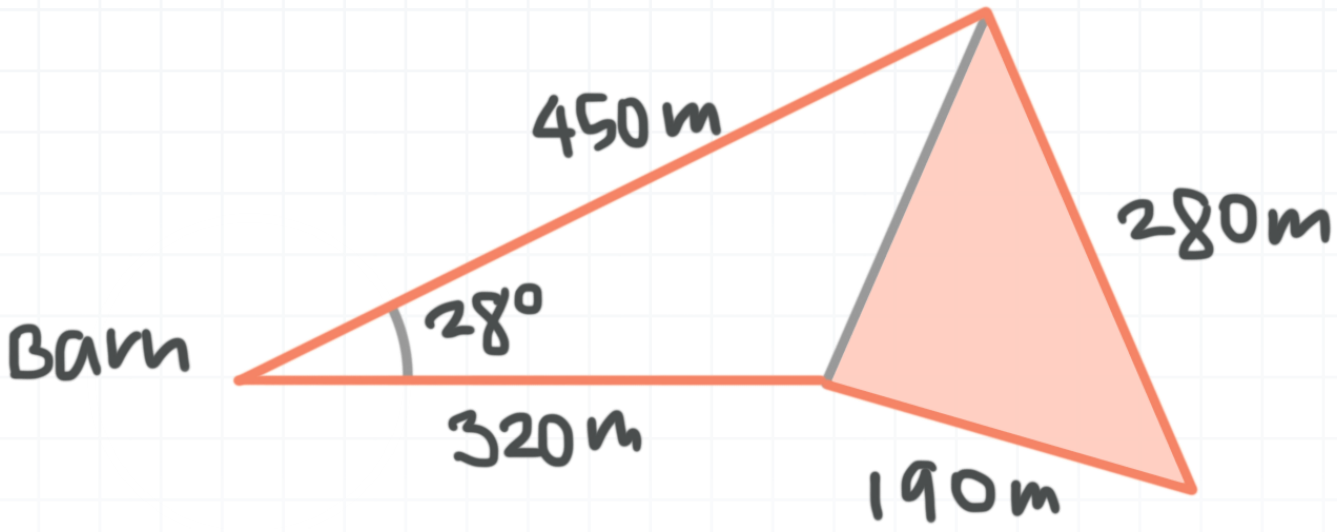

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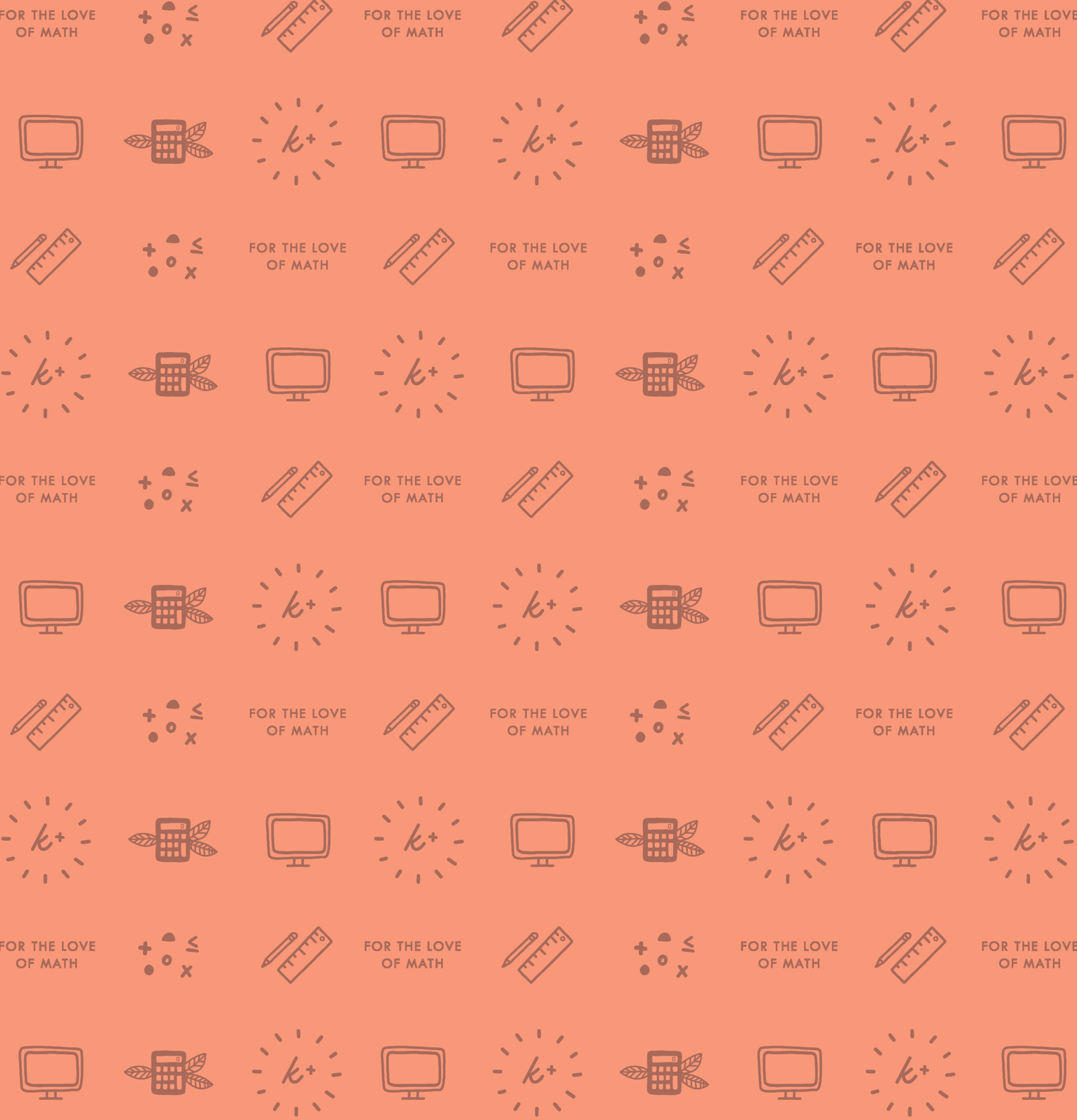

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